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10/702,048	11/06/2003	Noriaki Fukiage	FIS920060072US1 (RAJ-013)	7394

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EXAMINER	
TADAYYON ESLAMI, TABASSOM	
ART UNIT	PAPER NUMBER
1792	
MAIL DATE	DELIVERY MODE
10/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/702,048	FUKIAGE ET AL.	
	Examiner	Art Unit	
	TABASSOM TADAYYON ESLAMI	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18, 19-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18, 19-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "small resist foot" is not defined in the specification and is a relative term.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), further in view of Alfred Grill et al (U. S. Patent: 6497963, here after 963).

Claim 41 is rejected. 167 teaches a method for depositing a material on a substrate, the method comprising:

Placing a substrate in a chamber having plasma source and on a substrate holder [column 9 line 65];

Depositing (tunable) layers of materials on the surface [fig. 2B]. Depositing a first portion of a TERA layer on the substrate, wherein a first processing gas comprising first precursor is provided to the chamber (the deposition is via PECVD, therefore it is inside a chamber) [column 9 lines 65-68] and depositing a second processing gas comprising a second precursor is provided to the chamber, wherein the second precursor is chosen to reduce reaction with a photoresist [column 10 lines 7-9, column 10 lines 53-57]. 167 teaches performing discharge sequence (plasma process for the next layer, fig. 2B) wherein a bias voltage is provided during a pin up process (the substrate is inherently on a substrate holder) [column 9 lines 4-10]. 167 does not teach the bias source is a RF source. 963 teaches a method of depositing SiCH film via plasma process [abstract, column 6 lines 35-37], where the gas precursor is trimethylsilane [column 6 line 15], and the bias to the substrate is via a RF source [column 5 lines 23-25]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches, where the bias source is a radio frequency source as 963 teaches, because 963 teaches it is suitable to have a radio frequency to provide bias to substrate for deposition SiCH film.

5. Claims 1- 9,13-17, 20- 21, 23-24, 27-29, and 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), further in view of Shyh-Dar Lee et al (U. S. Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), and Alfred Grill et al (U. S. Patent: 6497963, here after 963).

Claim 1 is rejected. 167 teaches,

a method for depositing a material on a substrate, comprises,

placing a substrate in a chamber having a plasma source and on a substrate holder [column 9 line 65], wherein the deposition further comprises; flowing a precursor into the chamber at a constant flow rate [column 9 lines 5-7] where the chamber pressure is constant (200 mtorr) [column 9 line 8], and depositing a top layer of (TERA) layer [column 12 lines 57-62]. 167 teaches performing discharge sequence (plasma process for the next layer, fig. 2B) wherein a bias voltage is provided during a pin up process (the substrate is inherently on a substrate holder) [column 9 lines 4-10]. 167 also teaches the precursor is tetramethylsilane. The fact that the processing gas (tetramethylsilane) is not amine-based precursor (as is disclosed in 0046 of application the amine based precursor react with resist), and in fact the applicant use this precursor [0055 line 11]).Therefore, the precursor chosen to reduce reaction with a photoresist. 167 does not teach the precursor is provided to the chamber with an inert gas and also does not specifically teach the detail of the deposition process. Lee teaches a method of deposition a low dielectric layer from a plasma treatment of reaction gas comprising tertamethylsilane and CO2 (inert gas) to form SiCH layer [abstract, 0013]. Lee also teaches the flow rates of the tetramethylsilane and carbon dioxide is different in the chamber [0021]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches where deposition of the TERA layer (SiCH) is comprising flowing an inert precursor gas into the chamber with flowing rate different than the flowing rate of

tetramethylsilane as Lee teaches, because Lee teaches it is suitable to deposit SiCH layer with tetramethylsilane precursor and an inert gas. It is also obvious as the pressure of the chamber was 200 mtorr, by flowing the inert gas the chamber pressure would change and it is necessary to perform a stabilization process to achieve substantially constant pressure prior to deposition process to obtain a uniform coating. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches where deposition of the TERA layer (SiCH) as 167 and Lee teaches where the chamber pressure is stabilized prior to deposition the TERA layer, because it is necessary to obtain a uniform coating. Neither of the above references teaches a purging process before and after discharge process. 115 teaches a method of forming a SiCH film via plasma reaction of tetramethylsilane gas and inert gas [abstract, 0056-0057], and 115 also teaches after deposition a purging step removes the volatile matters from decomposition from the reaction chamber [0070]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 and Lee teach, where after each deposition step a purging process perform to remove the contamination from the chamber, because 115 teaches it is suitable to remove contamination from the chamber with purging process. None of the above references teaches the bias source is a RF source. 963 teaches a method of depositing SiCH film via plasma process [abstract, column 6 lines 35-37], where the gas precursor is trimethylsilane [column 6 line 15], and the bias to the substrate is via a RF source [column 5 lines 23-25]. Therefore it would have been

obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167, Lee, and 115 teach, where the bias source is a radio frequency source as 963 teaches, because 963 teaches it is suitable to have a radio frequency to provide bias to substrate for deposition SiCH film.

Claim 2 is rejected. 167, Lee and 115 teach the limitation of claim 1, since the application is to fabricate IC's and in nm size, [167 ref. column 1 lines 1-3, column 1 lines 29-33], therefore the photoresist features should be about nm and are very small (also please see column 5 lines 10-13).

Claim 3 is rejected. 167, Lee,115, and 963 teach the limitation of claim 1, and 167 teaches forming plurality of photoresist features on the photoresist compatible surface and she further teaches the feature comprises a well defined rectangle profile [fig. 10].

Claim 4 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 teaches the same precursor to form the TERA layer as the applicant use (tetramethylsilane) [column 8 line 60] underneath the photoresist layer, therefore it is inherent that it matches (reduce chemical reaction) with the resist and prevent formation of footings on the photoreist features [fig. 8 and column 5 lines 10-13] and the photoresist on the top portion also has rectangular profile [fig. 8].

Claim 5 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 further teaches isolating a bottom portion(layer 1) of the TERA layer from the photoresist with a top portion of the TERA layer(layer 3) [fig. 2B], thereby reducing the

formation of footing on photoresist features in a photoresist layer [fig. 8, column 5 lines 10-13].

Claim 6 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 further teaches providing a chemically inactive layer (TERA layer) between a chemically active layer (the substrate or the silicon dioxide layer) [column 8 line 37] and a photoresist layer [fig. 2B], wherein the precursor is chosen to create a dielectric material (SiCH) [column 8 line s 57-60] that does not chemically react with the photoresist layer.

Claim 7 is rejected. 167, Lee,115, and 963 teach the limitation of claim 1, and 167 further teaches the top portion of the TERA layer have a chemically inert surface [SiCH, column 10 lines 54-56] with plurality of rectangular photoresist features [Fig. 8].

Claim 8 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 further teaches there is no chemical interaction and therefore resist poisoning [column 10 lines 45-49] between the TERA layer [column 10 lines 54-56] and plurality of photoresist features having substantially rectangular profiles can be formed on the TERA layer [fig. 8].

Claim 9 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 further teaches,

a method of depositing material on a substrate wherein the depositing TERA layer during a depositing time comprises a material having a refractive index (n) of 2.1 and extinction coefficient of 0.5 [column 12 line 58-59, first layer] measured at the wavelength of 248 nm [column 12 lines 30 and 64].

Claims 13 and 24 are rejected. 167, Lee, 115, and 963 teach the limitation of claims 9 and 24. 963 also teaches the RF source frequency is 13.56 MHz and power of 9 watts [column 6 lines 15-21]. A *prima facie* case of obviousness exists where the claimed ranges and prior art do not overlap but are close enough that one in ordinary skill in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 f.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the plasma source has a RF source as 963 teaches because the claimed ranges and prior art do not overlap but are close enough that one in ordinary skill in the art would have expected them to have the same properties.

Claim 14 is rejected. 167, Lee, 115, and 963 teach the imitation of claim 13 as discussed above and 167 further teaches a method of deposition a TERA layer (comprises Si, C, O, H) [column 4 lines 12-24] on a substrate which meets the limitation of claims 1 and 10 as discussed above. 963 also teaches the RF source frequency is 13.56 MHz and power of 9 watts [column 6 lines 15-21]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the plasma source has a RF has the power of 9 watts and frequency of 13.56 MHz, because 963 teaches it is suitable to deposit TERA layer with having RF plasma source.

Claims 15 and 17 are rejected. 167, Lee, 115, and 963 teach the limitation of claim 9, 167 teaches another process gas comprises silicon and carbon containing

precursor (tetramethylsilane, 4MS) [column 8 line 60]. Since 167 teaches depositing top and bottom part of TERA layer, the precursor can be chose independent from each other. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer where the bottom part is depositing by tetramethylsilane precursor and the top portion is deposited by trimethylsilane precursor, because 167 teaches it is suitable to deposit the TERA layer with these precursors.

Claim 16 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 15; Lee teaches silicon containing and carbon containing precursor with the rate of 500-2500 sccm [column 8 line 60]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches where the flow rate of the gases are based on what Lee teaches, because as Lee teaches it is suitable flow rate range for gases to deposit SiCH layer.

Claims 20 and 21 are rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 teaches controlling the pressure of the chamber and the pressure in the range of 0.2 torr [column 8 line 61].

Claim 23 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1, and 167 further teaches depositing a top portion of the TERA layer, wherein the top portion comprises a material having a refractive index of 1.9 and extinction coefficient of 0.25, when measured at a wavelength of 248 nm [column 12 line 61].

Claims 27 and 28 are rejected. 167, Lee, 115, and 963 teach the limitation of claim 23, 167 further teaches the process gas includes silicon containing precursor,

carbon containing gas, oxygen [column 8 lines 66-67, column 9 lines 7],and Lee teaches the processing gas includes inert gas(CO2)[0013].

Claim 29 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 27. Lee teaches the precursor is flowed at rate of 500-2500 and the inert gas flowed with the rate of 500-1500sccm [0021last 4 lines]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches where the flow rate of the gases are based on what Lee teaches, because as Lee teaches it is suitable flow rate range for gases to deposit SiCH layer.

Claim 31 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 27 as discussed above and Lee teaches the inert gas(CO2) comprises oxygen. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer as 167 teaches where the inert gas is carbon dioxide, because as 115 teaches it is suitable to form a TERA layer with tetramethylsilane and carbon dioxide.

Claim 32 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 28 and 167 teaches the processing gas comprises tetramethylsilane (4MS) [column 8 line 60].

Claim 33 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 32, and 167 teaches controlling the chamber pressure to be lower than 3 torr [column 8 line 58].

Claims 34-35 are rejected. 167, Lee, 115, and 963 teach the limitation of claim 33, and 167 further teaches depositing the TERA layer (top portion) comprises controlling the temperature of the substrate to greater than 300 C [column 10 lines 1-2].

Claim 36 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 32, and 167 further teaches controlling the substrate temperature at 60 °C [column 8 line 62].

6. Claims 10-12, 18 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), Shyh-Dar Lee et al (U. S. Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), a Alfred Grill et al (U. S. Patent: 6497963, here after 963), as applied to claim `1 above, further in view of Houng T. Nguyen et. a. (U. S. Patent application: 2003/0017694, here after 694).

Claim 11 is rejected. 167, Lee, 115, and 963 teach the limitation of claim 1 as discussed above, they do not teach a method of deposition a TERA layer (comprises Si, C, O, H) [column 4 lines 12-24] on a substrate. 167 does not specifically teach the deposit rate of the bottom portion of the TERA layer is about 100-10000 A/ min. 694 teaches a method of deposition of organosilicate layers [abstract lines 1-2] wherein the deposit rate of the organosilicate material is in the range of 1000-20000 A/ min [0055 lines 12-14]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the deposition rate of the TERA layer is 100-10000 A/ min, because 694 teaches it is suitable to deposit TERA layer with these deposition rate.

Claims 10 and 12 are rejected. 167, Lee, 115, and 963 teach the limitation of claim 9 above, 167 teaches a method of deposition a TERA layer (comprises Si, C, O, H) [column 4 lines 12-24] on a substrate. They do not specifically teach the deposition time for depositing the bottom layer is between 5-18 seconds. 694 teaches a method of

deposition of organosilicate layers [abstract lines 1-2] wherein the deposit rate of the organosilicate material is 20000 A/ min [0055 lines 12-14]. 694 further teaches the thickness of the layer is about 3000 A [0057 lines 4]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the deposition time of the bottom TERA layer is about 9 sec, because 694 teaches within this time the thickness of the TERA layer is appropriate.

Claim 18 is rejected. 167, Lee, 115 and 963 teach the limitation of claim 15 as discussed above and 167 further teaches a method of deposition a TERA layer (comprises Si, C, O, H) [column 4 lines 12-24] on a substrate which meets the limitation of claim 15 as discussed above. They do not specifically teach the processing gas comprises CH_4. 694 teaches a method of deposition of organosilicate layers [abstract lines 1-2] wherein the processing gas comprises CH_4 [0053 line 3]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the processing gas comprises CH_4, because 694 teaches methane is a suitable gas for deposition of organosilicate layer.

Claim 25 is rejected for the same reason claim 11 is rejected [also see ref. 167, 0064 lines 2-5].

Claim 26 is rejected for the same reason claim 12 is rejected [also see ref. 167, 0064 lines 2-5].

7. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), Shyh-Dar Lee et al (U. S.

Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), and Alfred Grill et al (U. S. Patent: 6497963, here after 963), as applied to claim 27 above, further in view of A. Grill, Journal of Applied Physics, Vol. 93 (2003) 1785-1790, here after Grill.

167, Lee, 115, and 963 teaches limitation of claim 27, as discussed above. they do not teach the precursor comprises TMCTS. Grill teaches a method for depositing SiCOH by PECVD when the precursor is TMCTS [column 2 line 4 and 27, page 1785] (mixing with inert gas (column 1 line 6 page 1786). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method for depositing SiCOH film via PECVD that 167 teaches when the precursor is TMCTS, because Grill teaches it is suitable to use TMCTS for depositing SiCOH film via PECVD process.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), Shyh-Dar Lee et al (U. S. Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), and Alfred Grill et al (U. S. Patent: 6497963, here after 963), as applied to claim 9 above, further in view of Craig A. Roderick (U. S. Patent: 6074488, here after 488).

167, Lee, 115, and 936 teach the limitation of claim 9 as discussed above. They do not teach the DC voltage is applied to an electrostatic chuck. 488 teaches a method of plasma deposition [column 10 lines 42-46] where a DC voltage applied to the electrostatic chuck [column 2 lines 58-60]. He further teaches the DC voltage is about

200-2000 Volts [claim 32]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of plasma deposition wherein the DC voltage to an electrostatic chuck of about 200-2000 Volts to hold the substrate and generate plasma, because 488 teaches it is desirable to deposit material on a surface by such a plasma processing to eliminate extraneous components [column 2, lines 55-65].

8. Claims 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), Shyh-Dar Lee et al (U. S. Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), and Alfred Grill et al (U. S. Patent: 6497963, here after 963), as applied to claim 1 above, further in view of Tae K. Won (U. S. Patent Application: 2003/0044621, here after Won).

167, Lee, 115 and 963 teach a method of deposition a TERA layer (comprises Si, C, O, H) [column 4 lines 12-24] on a substrate which meets the limitation of claim 1, as discussed in the 35 U.S.C. 102(b) rejection above, they do not teach controlling the chamber wall temperature. Won teaches a method of deposition of organosilicate layers [abstract lines 7-9] wherein where the chamber wall temperature is controlled [0051 lines11 to the end] in order to obtain uniform film [claim 2 lines 7-10], Won further teaches the temperature is between 380-410 °C [claim 2 line 9-10]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which chamber wall temperature is

controlled and is between 380-410 C, because Won teaches the deposited film will be uniform with controlling the chamber temperature between 380-410 C.

9. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over M. Angeopoulos et al (U. S. Patent: 6316167, here after 167), Shyh-Dar Lee et al (U. S. Patent Application: 2003/0228750, here after Lee), Kamal Kishore Goundar et al (U. S. Patient Application: 2004/0147115, here after 115), and Alfred Grill et al (U. S. Patent: 6497963, here after 963), as applied to claim 1 above, further in view of Zheng Yuan (U. S. Application: 2002/0163028, here after Yuan).

167, Lee, 115 and 963 teach the limitation of claim 1, 167 further teaches a shower head assembly is coupled to the chamber [120 fig. 2 and 0027 lines 3-5]. None of the above references specifically teach the temperature of the showerhead. Yuan teaches a method for depositing film on a substrate [abstract lines 1-2, 0007 lines 1-4], where the temperature of showerhead is about 90-120 C [0040 lines 3-12], to enhance the reaction time between the species. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the showerhead temperature is controlled and is between 90-120 C, because Yuan teaches it enhance the reaction time between the species.

10. Claim 40 is rejected. 167, Lee, 115, 963 and Yuan teach the limitation of claim 38, as discussed above. 167 further teaches a shower head assembly is coupled to the chamber [120 fig. 2 and 0027 lines 3-5]. Yuan teaches a method for depositing film on a substrate [abstract lines 1-2, 0007 lines 1-4], where the temperature of showerhead is about 90-120 C [0040 lines 3-12], to enhance the reaction time between the species.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of deposition of TERA layer in which the showerhead temperature is controlled and is between 90-120 C, because Yuan teaches it enhance the reaction time between the species.

Response to Arguments

11. Applicant's arguments filed 06/20/08 have been fully considered but they are not persuasive. The applicant amended claim 19 to overcome 35U.S.C112 rejection. The applicant amended claim 2 to overcome 35U.S.C112 rejection, however the amendment to the claim is not sufficient to over come the rejection for claim 2 as the relative term of "small resist footing" is not defined.

The applicant amended claim 1 to overcome the rejection. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection as discussed above.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tabassom T. Tadayyon-Eslami whose telephone number is 571-270-1885. The examiner can normally be reached on 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tabassom T. Tadayyon-Eslami/

Examiner, Art Unit 1792

/Timothy H Meeks/

Supervisory Patent Examiner, Art Unit 1792